clination of the plates to the beam the colours can be changed at pleasure.

In this form the experiment is well suited for class illustration; care is necessary to avoid irregular reflection at the edges of the plates; we covered ours with ordinary gum paper.

B. A. SMITH.

Working Men's College, Melbourne, October 10.

Mutual Aid among Animals.

RECENT discussion of this subject has recalled my attention to an observation made some time ago, while studying the animals of Casco Bay, on the coast of Maine.

Among the specimens brought back from one excursion were four of the common Echini (*E. drobachiensis*). The last one taken had been left exposed to the sun some time before it was noticed and properly cared for.

These four animals were placed alone in a small aquarium, and, as we wished to study the action of the ambulacræ, each was turned mouth up. Soon the action began, with which every naturalist is familiar, and three of the captives slowly rose on edge, and then deliberately lowered themselves into the normal position. The fourth, the injured one, made much less rapid progress: all it could achieve was a slight tipping of its disk. The two nearest Echini, from six to eight inches distant, now moved up and stationed themselves on opposite sides of their disabled comrade.

Fastening their tentacles for a pull, they steadily raised the helpless urchin in the direction in which it had started. As soon as it was possible, one of the helpers moved underneath the edge of the disk on the aboral side, and, when the half-turn was accomplished, the other took station on the oral side, gradually moving back as the object of so much solicitude was very gently lowered to the position nature had made most convenient.

This is the best instance of "giving a lift" I have ever met with among animals of so low a grade. It may not be without interest to others.

WM. ELDER.

Colby University, Waterville, Maine, U.S.A.

The Chrysanthemum.

THIS being the centenary year of the introduction of the Chrysanthemum into England, a word on the subject from its native place, Peking, may not be out of place. It is not generally known that the Chinese grow the Chrysanthemum as a standard tree especially for selling. They graft them on to a stalk of Artemisia. There is a species of Artemisia that grows wild and covers the waste ground round Pekin; it springs from seed every year, and by the autumn attains to a tree 8 or 10 feet high with a stem 1½ inch thick. The Chinese cut it down, and, after drying it, use it as fuel; the small twigs and seeds are twisted into a rope, which is lighted and hung up in a room to smoulder for hours; the pungent smell of the smoke drives out the mosquitoes. This plant, after being potted, is cut down to about 3 feet and used as the stock, the twigs of Chrysanthemum are grafted round the top, and it quickly makes a fine tree, the flowers grow and open, and as the stock soon withers the whole tree dies, and folks say, "another ingenious fraud of the Chinamen."

A favourite style of growing Chrysanthemums is in the shape of a fan, with eight or ten flowers in different parts of it. If the flowers are not grown on the plant, they are tied on, which also does for selling.

The winters in Peking are very cold, and last about four months, and having no glass houses the Chinese gardeners do not have the chance of producing such a variety or such fine flowers as their European brethren, but in the case of Chrysanthemums they have many curious and beautiful varieties.

THOS. CHILD.

Dispersal of Freshwater Shells.

I AM putting together such instances as I can find of dispersal of freshwater bivalves by closure of their shells so as to cling to the toes of birds, amphibia, water-beetles, &c., and of univalves by adhesion to the wing-cases of water-beetles, &c., and venture to ask for co-operation. Any notes or references which your readers may have the kindness to send to the undermentioned address will be welcomed and carefully acknowledged.

H. WALLIS KEW.

5 Giesbach Road, Upper Holloway, N.

The Common Sole.

THE post-larval flat-fish obtained in 80 fathoms off the west of Ireland, which in NATURE (vol. xlii. p. 520) I referred to as common sole, have turned out, on closer examination to be the fry of *Pleuronectes cynoglossus*, called "white sole" in the Dublin markets.

I shall feel obliged by your finding space for this correction.

Dublin, November 15. W. SPOTSWOOD GREEN.

The Scientific Investigations of the Fishery Board for Scotland.

IN the review of the "Eighth Report of the Fishery Board for Scotland," which appeared in NATURE (vol. xlii. p. 653), the reviewer, misled by the private information to which he refers, makes an inaccurate and baseless statement, reflecting upon me personally, and which I therefore crave leave at once to correct. In dealing with my report on immature fish, which, by the courtesy of the Secretary for Scotland, was placed in the hands of the delegates of the recent International Fisheries Conference, and which has already been referred to in your columns by Prof. McIntosh, F.R.S., the reviewer states: "We have certain information that the *original discoveries which led to* this report were made" by Mr. T. Scott; and that "it is only fair that the credit which is Mr. T. Scott's due, *and which is denied him there*, should be acknowledged here."

Had your reviewer disregarded his private information, and looked at p. 161 of the paper which he has reviewed, he would have found there the following footnote to the statement that "nearly 13,000 food-fishes" had been "carefully measured, and the condition of the reproductive organ registered," viz., "*This has been mainly done by Mr. Thomas Scott, F.L.S., one of the naturalists of the Fishery Board, and partly by Mr. Peter Jamieson, assistant naturalist.*"

What Mr. Scott and Mr. Jamieson did was precisely what is stated—namely, to measure the length of the fish and record on the form provided whether the milt or roe was mature or not. The subjoined note from Mr. Thomas Scott, which I request you to publish along with this, shows that he considers this acknowledgment sufficient. The study and elaboration of these daily records, nearly 13,000 in number, mainly in my private time, was only a part, and a small part, of many months of labour bestowed on my report on immature fish; and the results occupy less than three pages of the fifty-four devoted to the subject. No other person had any part or share whatever in the conception or composition of that report, and this attempt to deprive me of the credit of my work, solely on the strength of private and erroneous information, is not, I think, either usual or creditable.

The reviewer is equally in error as to what I wrote in the Report for 1887, and which he only partially quotes. The entire sentence is as follows: "We have organized a series of extensive and systematic inquiries into the condition of the reproductive organs of the various kinds of fish throughout the year, with particulars as to their sizes, the nature of their food, &c., which will help to clear up the hitherto obscure problems as to the minimum size of sexually mature individuals, the commencement and duration of the reproductive period, the spawning places, and many other points of great interest." If the reviewer will now peruse p. 8 of the Seventh Report, he will find it there stated that these inquiries were "*devised by Dr. Wemyss Fulton*" (in 1887), which is the fact.

T. WEMYSS FULTON.

20 Royal Crescent, Edinburgh, November 3.

14 *Lorne Street, Leith, November* 1.

DEAR SIR,—I have read the article in NATURE of October 30, and desire to say that I consider the footnote at p. 161 of part iii. of the Board's Report for 1889 a sufficient acknowledgment of my work in connection with the immature fish investigation.

You have always from the first acted towards me in a very friendly manner, and would be the last to detract from any credit belonging to me.

THOMAS SCOTT.

Dr. T. Wemyss Fulton, Secretary Scientific Investigations.

Araucaria Cones.

HAVING been away from home, I have only now seen the Duke of Argyll's letter in NATURE of November 6 (p. 8), relating to the cones of Araucaria. Doubtless before this some of your correspondents have answered the Duke's inquiry.

© 1890 Nature Publishing Group

It is not very unusual for the *Araucaria imbricata* to produce cones. The first I myself remember to have seen were on the old tree in the Royal Gardens, Kew, in the summer of 1851 or thereabouts. The female cones are large globular masses, the constituent scales of which are not (superficially) very different from the ordinary leaves. What the Duke describes are evidently the male catkins. The trees are ordinarily diœcious, but I have once seen and figured an example in which male catkins and female cones were borne on the same tree.

London, November 14. MAXWELL T. MASTERS.

IN the garden of the house Bleckley, Shirley Warren, Southampton, there is an Araucaria that for many years past has produced annually a large number of cones. The cones are from 40 to 100 in number, and very large, so that their breaking up and falling on to the lawn is a serious inconvenience, it being difficult to sweep them up. No fertile seeds have been produced by this tree, which from all I have been able to learn is the finest Araucaria in England; the trunk is over 6 feet in circumference some 2 feet above the ground. There is no history of the tree.

Cambridge, November 15. D. SHARP.

IF the Duke of Argyll refers (November 6, p. 8) to ovule-bearing cones, which are spherical and about 7 inches in diameter, these have been plentifully produced in almost every part of the British Isles.

Male or pollen cones (catkins), of cylindrical shape and 3 inches long, are, however, extremely rare, although they have been produced in the Bicton Pinetum and on one of Earl Derby's Kentish properties. A tree at the latter place bears annually, and has done so for some years, a heavy crop of perfectly-developed pollen cones; indeed, so great is the quantity that at a short distance away the tree has quite an unusual and remarkable appearance. A. D. WEBSTER.

Holwood Estate, Kent, November 17.

ATTRACTIVE CHARACTERS IN FUNGI.

THIS subject, which has been introduced by a letter from a correspondent (November 6, p. 9), is one of considerable interest, but it is one also of great mystery and difficulty. In dealing with fungi of the mushroom type we are in contact with a class of plants so different from Phanerogams that it is at once evident that we must not draw the same conclusions from a similar series of initial facts. It is well known that certain fungi possess strong and characteristic odours, and others very conspicuous colours, both of which features are presumed to have some value in the biography of the plant, but *what* influence and *what* value it is not so easy to determine as in the case of plants in which cross-fertilization has to be effected. It is by no means certain that there is any special act of fertilization at all; it is even doubtful if any fertilizing element exists. For nearly a century it has been thought possible to find a fecundating element in Agarics, but all efforts at demonstration have failed.[1] Most of these investigations have been directed to the cystidia, large cells which are recognized as projecting, more or less, on the surface of the hymenium, but these could not be identified with any known process of fecundation.[2] M. de Seynes, after patiently investigating the hymenium of the *Hymenomycetes*, arrived at a negative result, and this has not since been disturbed. "The hymenium," he says, "has not yet offered an organ which we may suppose in reality to be the male organ;" and he adds, "one sole and self-same organ is the basis of it, according as it experiences an arrest of its development; as it grows and fructifies, or as it becomes hypertrophied, it gives us a paraphysis, a basidium, or a cystidium; in other terms, atrophied basidium, normal basidium, hypertrophied basidium: these are the three elements which form the hymenium. Does it develop either outside the hymenium or on the hymenium, at a time, or in a part which has not yet been discovered, organs which yield pollen, spermatia, antherozoids, or any other fecundating agent? This is what remains to be discovered."[1]

Amongst British mycologists Mr. Worthington Smith has been the most persistent in belief that Agarics are subject to hybridism, which implies cross-fertilization, but he has not contributed much towards the establishment of the proposition that fertilization really exists, except perhaps to emphasize the suggestion that the cystidia are male organs. In his paper on the reproduction in *Coprinus radiatus*,[2] he remarks: "I consider it quite possible that the mere contact of the threads (or fluid) from the cystidia with the threads from the unpierced spores may be sufficient for the production of a new plant." In more direct reference to the question of hybridism he writes:—"On a dung-heap, which will produce *Coprinus radiatus*, other species, as *C. nycthemerus*, &c., are sure to appear; and not only do allied species come up in company with *C. radiatus*, but every intermediate form between one and the other may be gathered any morning. These latter plants belong to no species described as such, but are natural hybrids, doubtlessly produced by the spermatozoids of one plant piercing the spores of another. Amongst the larger species of Agarics similar forms are quite common, and they prove sore puzzles for those men who only want *names* for the fungi they find."

No one with any extended experience in field work can gainsay that individual Agarics are often met with which strongly suggest hybridism. These forms are so intermediate between more typical forms, with which they were perhaps growing, that it is difficult to get rid of the idea altogether that they are modifications due to some such influences as in higher plants we attribute to hybridization. It would be very unphilosophical to deny absolutely that they are possibly hybrids; but, on the other hand, it would be as bad to declare them hybrids until some sort of impregnation can be demonstrated.

Admitting that hitherto all efforts to discover any process of fertilization in Agarics, which will stand the test of examination, has failed, the difficulty is increased in speculating upon the "why and wherefore" of the phenomena of odour, taste, and colour, in the larger fungi. Yet, notwithstanding this, we may approach nearer the desired end by endeavouring to collect facts, which may some day, by accumulation, serve as a basis for hypothesis.

Why do certain fungi possess very strong odours, which to our olfactory nerves are agreeable or disagreeable? There is a small whitish Agaric, not uncommon amongst grass in woods, which has such a strong and peculiar odour that it is named *Agaricus* (*Clitocybe*) *fragrans*. It is not more than about an inch in diameter, is mild to the taste, very pleasant to eat when cooked, and the odour remains after the plant has been dried for some time. Some persons detect in it a resemblance to anise, others to melilot, or the Tonquin bean, and others again regard it as an odour peculiarly its own. Two or three other species, to be found in similar localities, might, at a glance, be confounded with it, but that they are destitute of the odour and pleasant flavour. The novice could at once distinguish this fungus from its associates by its odour, but wherefore it should smell so sweet whilst the others do not is at present an unsolved mystery. It is certainly not specially attractive to insects, and we have never found it attacked by slugs; perhaps the odour is disagreeable to them.

Another Agaric may be found amongst dead leaves, which is twice as large, and of a singular pale verdigris-green colour (*Agaricus* (*Clitocybe*) *odorus*). It possesses very nearly the same odour, possibly a little stronger, and the same agreeable taste. This, again, we have always observed to be free from any indication of attacks from slugs. We have failed to detect the same odour, except

---

[1] De Bary, "Morphologie und Physiologie der Pilze," cap. v.

[2] See *Grevillea*, vol. i. (1873), p. 181.

[1] *Grevillea*, vol. ii. p. 41.

[2] *Grevillea*, vol. iv. (1875), p. 53.

© 1890 Nature Publishing Group